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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/751,503 | 01/06/2004 | Hsiu-Chun Lee | LEE3016/EM | 3353 |

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| EXAMINER |
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LEE, HSIEN MING

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| ART UNIT | PAPER NUMBER |
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2823

DATE MAILED: 01/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/751,503

Applicant(s)

LEE ET AL.

Examiner

Hsien-ming Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

HSIEN-MING LEE
PRIMARY EXAMINER

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In light of Figs.2, 6 and 7, claim 1 recites providing a substrate (10); forming a plurality of operation layers (12/141/6) on said substrate (10); forming a photoresist layer (18) on the uppermost one of the operation layers (16) to define a position to be removed; removing a portion of the operation layers (16) at said position to form an opening (20'); forming a liner layer (22') on the sidewall of the opening (20'); and *removing another portion of the operation layers (12/14) corresponding to the opening (20')* to further form a second opening (20").

Obviously, the substrate (10) is kept intact, as shown in Fig.7. It is not clear as to why a portion of the substrate (10) corresponding to the opening being removed.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-4 and 6-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Vasquez et al. (US 4,994,406).

In re claim 1, Vasquez et al. teach the claimed method for forming a shallow trench, said method comprising steps of:

- providing a substrate 10 (Fig.1);
- forming a plurality of operation layers 12/14/16/18 on said substrate 10 (Fig.1);
- forming a photoresist layer 20 on the uppermost one 18 of the operation layers 12/14/16/18 to define a position to be removed (Fig.1);
- removing a portion 16/18 of the operation layers 12/14/16/18 at said position to form an opening 22 (Fig.2);
- forming a liner layer 24 on the sidewall of the opening 22 (Fig.3); and
- removing a portion of the substrate 10 corresponding to the opening 22 to form a deep trench 26 (Fig.4).

In re claims 2-4, Vasquez et al. teach that the liner layer 24 comprises dielectric material, i.e. a silicon oxide isolating material (col. 2, lines 60-61).

In re claim 7, Vasquez et al. teach the claimed method for forming a shallow trench, said method comprising steps of:

- providing a substrate 10 (Fig.1);
- forming a plurality of operation layers 12/14/16/18 on said substrate 10 (Fig.1);
- forming a photoresist layer 20 on the uppermost one 18 of the operation layers 12/14/16/18 to define a position to be removed (Fig.1);
- removing a portion of the uppermost one 16/18 of the operation layers 12/14/16/18 at said position to form an opening 22 (Fig.2);
- forming a liner layer 24 on the sidewall of the opening 22 (Fig.3);

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- removing a portion of the other ones 12/14 of the operation layers 12/14/16/18 corresponding to the opening 22 (Fig.4); and
- removing a portion of the substrate 10 corresponding to the opening 22 to form a deep trench 26 (Fig.4).

In re claims 8-9, Vasquez et al. teach that the liner layer 8 comprises dielectric material, i.e. a nitride material (col. 2, lines 60-62).

In re claims 6 and 10, Vasquez et al. teach that the oxide liner layer 24 is formed on the sidewall of the opening 22 by deposition, i.e. CVD or PECVD (Fig.3 and col. 2, lines 60-64).

5. Claims 1-8 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Kepler et al.(US 6,143,624).

In re claims 1 and 7, Kepler et al. teach the claimed method for forming a shallow trench, said method comprising steps of:

- providing a substrate 1 (Fig.2A);
- forming a plurality of operation layers 2 and 3 on said substrate 1 (Fig.2B);
- forming a photoresist layer 4 on the uppermost one 3 of the operation layers 2/3 to define a position to be removed (Fig.2C);
- removing a portion of the uppermost one 3 of the operation layers 2/3 at said position to form an opening 30 (Fig.2D);
- forming a liner layer 5 on the sidewall of the opening 30 (Fig.2E);
- removing a portion of the other one 2 of the operation layers 2/3 corresponding to the opening 30 (Fig.2G); and

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- removing a portion of the substrate 1 corresponding to the opening 30 to form a deep trench 6 (Fig.2G).

In re claims 2-5, 8 and 10, Kepler et al. teach that the liner layer 5 comprises dielectric material, i.e. a TEOS-silicon oxide isolating material (col. 6, lines 3-8).

In re claims 6 and 10, Kepler et al. teach that the oxide liner layer 5 is formed on the sidewall of the opening 30 by deposition, i.e. LPCVD (col. 6, lines 3-8).

Double Patenting

6. Claim 10 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 6. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hsien-ming Lee whose telephone number is 571-272-1863. The examiner can normally be reached on Tuesday-Thursday (8:00 ~ 6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Hsien-ming Lee
Primary Examiner
Art Unit 2823

Jan 13, 2005

HSIEN-MING LEE
PRIMARY EXAMINER

Lee
1/13/2005